

GAO

February 1990

# NUCLEAR WASTE

## Transuranic Waste Storage Limitations at Rocky Flats Plant



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Resources, Community, and  
Economic Development Division

B-221801

February 28, 1990

The Honorable Mike Synar  
Chairman, Environment, Energy,  
and Natural Resources Subcommittee  
Committee on Government Operations  
House of Representatives

The Honorable David E. Skaggs  
House of Representatives

In response to your December 14, 1989, letter, we are providing you with information on when the Department of Energy's (DOE) Rocky Flats Plant's 1,601-cubic-yard limit on transuranic (TRU)<sup>1</sup> waste storage is likely to be reached and DOE's current plans for resolving the on-site TRU waste storage problem at Rocky Flats. As agreed with your offices, this report is limited to providing information on those actions that can be taken on-site to address Rocky Flats' storage problem.

## Results in Brief

The current shutdown of Rocky Flats' weapons component production facilities<sup>2</sup> and the uncertain duration of the shutdown prevents us from making projections as to when on-site TRU-mixed waste<sup>3</sup> storage capacity will be reached. However, once restarted, production could continue for as long as 6 to 8 months, depending on how successful Rocky Flats is in identifying and removing some nonregulated wastes from the current inventory. Production beyond this point cannot be assured until Rocky Flats installs a supercompactor to reduce the volume of waste stored on-site or arrangements are made to store the TRU-mixed waste off-site.

## Background

The Rocky Flats Plant is a government-owned, contractor operated, nuclear materials production facility located on a 6,550-acre site approximately 16 miles northwest of Denver, Colorado. The facility's primary mission is to produce plutonium and other metal components

<sup>1</sup>DOE defines TRU waste as any waste contaminated with radioactive elements heavier than uranium at levels greater than 100 nanocuries per gram. (A nanocurie is a billionth of a curie.) Typical waste forms include contaminated glassware, equipment, tools, rubber gloves, paper products, clothing, and soil.

<sup>2</sup>On November 13, 1989, DOE began a shutdown of Rocky Flats' weapon component production. As of February 6, 1990, DOE had not decided when plant operations will restart.

<sup>3</sup>Mixed waste contains both radioactive and hazardous components, as defined by the Atomic Energy Act and the Resource Conservation and Recovery Act, respectively.

for nuclear weapons. Some of the production activities generate TRU waste as a by-product, the majority of which is mixed with other hazardous wastes such as solvents and other toxic wastes. On January 1, 1990, EG&G Rocky Flats, Inc., replaced Rockwell International as the plant operator.

Since 1954, the Idaho National Engineering Laboratory has stored the transuranic waste generated at Rocky Flats. However, the Governor of Idaho temporarily banned such shipments into the state in late October 1988 because he believed DOE had made and broken too many promises to remove nuclear waste from the Idaho location.<sup>4</sup> Although the Governor subsequently allowed additional waste shipments from Rocky Flats to Idaho National Engineering Laboratory, he reimposed the ban in August 1989. DOE plans to continue storing waste on-site at Rocky Flats until permitted capacity is reached unless arrangements can be made for storing this waste at other temporary storage facilities or placing it in the nation's first permanent nuclear waste repository—the Waste Isolation Pilot Plant (WIPP) being constructed near Carlsbad, New Mexico.

According to Rocky Flats officials, the storage of TRU waste at Rocky Flats is regulated by either DOE or the Environmental Protection Agency (EPA)/Colorado Department of Health, depending on the composition of the waste. Under the Atomic Energy Act of 1954, DOE is responsible for managing and disposing of radioactive waste. However, if radioactive waste is mixed with hazardous waste subject to regulation under the Resource Conservation and Recovery Act (RCRA)(42 U.S.C. 6901, *et seq.*), the mixed waste is regulated by EPA or EPA-authorized states. Effective November 7, 1986, Colorado was granted authority from EPA to regulate mixed radioactive waste within its borders.

On November 13, 1989, DOE began a shutdown of Rocky Flats' weapons component production to inventory plutonium materials on hand and to develop new safety and management procedures. According to Rocky Flats' Associate General Manager for Defense Production, weapons component production at the facilities will not resume until it is safe to do so and employees have been adequately trained in the proper operating procedures for each facility. As of February 6, 1990, DOE had not decided when plant operations will restart.

<sup>4</sup>We reviewed the legal basis for the Governor's actions and concluded that there is no legal basis for the actions and that these actions violate the supremacy clause of the U.S. Constitution. (B-221801.3, June 1, 1989.)

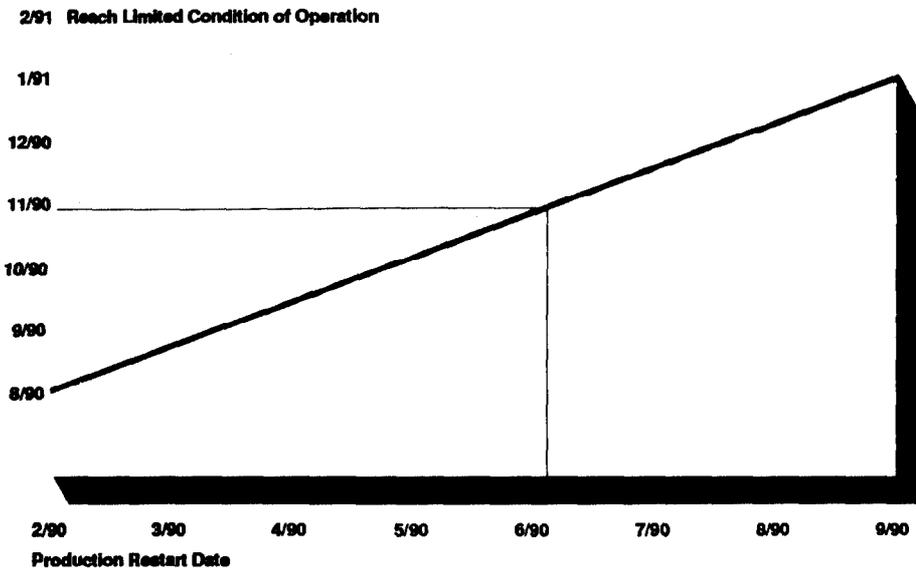
## On-Site TRU-Mixed Waste Storage Is Nearing Capacity

Unless steps are taken to extend on-site TRU-mixed waste storage capacity, Rocky Flats may be faced with another shutdown within about 6 months of production restart. According to Rocky Flats officials, on-site storage of TRU-mixed waste, which comprises 90 to 95 percent of Rocky Flats' stored TRU waste, is limited by the state of Colorado to 1,601 cubic yards. This limit was agreed to by DOE in a July 14, 1989, Settlement Agreement and Compliance Order on Consent. According to Rocky Flats officials, Rocky Flats has decided to stop weapons component production when the inventory reaches 1,491 cubic yards (hereafter, this decision point is referred to as the "Limited Condition of Operation") so that wastes created in the process of closing and maintaining the production facilities can be stored within the permitted capacity. For the week ending January 28, 1990, Rocky Flats records showed that about 1,063 cubic yards of TRU-mixed waste was stored on-site.

The current shutdown of weapons component production at the plant and the amount of waste generated during this shutdown precludes making accurate projections as to when Rocky Flats' permitted storage capacity will be reached. Further compounding the difficulty in making projections is the timing of when individual buildings that generate TRU-mixed waste will be allowed to restart production operations. Figure 1 shows when Rocky Flats may reach Limited Condition of Operation, assuming Rocky Flats generates 20 cubic yards per month during the current shutdown—the generation rate estimated by EG&G Idaho in November 1989<sup>5</sup>—and 70 cubic yards per month when production resumes.

<sup>5</sup>Predecisional Environmental Assessment Annotated Outline for Alternative Near-Term Storage of Rocky Flats Plant Transuranic Waste, dated November 13, 1989.

**Figure 1: Estimated Date When Limited Condition of Operation Will Be Reached**  
(Based on Jan. 28, 1990 Inventory)



**Assumes: 70 cubic yards/month during production, 20 cubic yards/month during shutdown**

Source: Prepared by GAO using Rocky Flats data.

If Rocky Flats, for example, begins production in June 1990, as shown by the thin line on figure 1, Limited Condition of Operation would be reached about the first of November 1990. However, this projection may be conservative, according to Rocky Flats officials, because less waste is being generated during the current shutdown. For example, during the month of January 1990, Rocky Flats only generated 10 cubic yards of TRU-mixed waste.

According to Rocky Flats waste management officials, on-site storage of unmixed TRU waste (i.e., radioactive waste not contaminated with hazardous substances) is not regulated by Colorado under RCRA and its storage is only limited by the amount of physical space available. According to these officials, storage space for the small volume of such waste (about 3.5 cubic yards per month) can be located as needed. An EG&G Rocky Flats Waste Storage Inventories Document showed that, as of February 4, 1990, approximately 132 cubic yards of unmixed TRU waste was being stored at Rocky Flats.

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## Rocky Flats Is Taking Initiatives to Extend Storage Deadline

Rocky Flats officials plan to extend the amount of time before Limited Condition of Operation is reached by continuing efforts to reduce the volume of waste generated; removing some waste, not subject to the 1,601 cubic-yard limit, from the current TRU-mixed waste inventory; and installing a supercompactor to reduce both the volume of waste newly generated and in the current inventory. If the anticipated savings materialize, the plant could continue operations into fiscal year 1992. Some initiatives provide more near-term prospects of anticipated savings than others.

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## Rocky Flats Has Reduced Waste Generation

In January 1988 Rocky Flats established a Waste Minimization Program Office to oversee planning and implementation of the program plan. In its 1989 draft Waste Minimization Assessment Report, Rocky Flats officials stated that they had made many efforts to reduce the TRU-mixed waste generated at Rocky Flats. Monthly generation of such waste was reduced from an average of 361 cubic yards in fiscal year 1984 to an average of 95 cubic yards during the first 10 months of 1989. To achieve these reductions, Rocky Flats officials stated that they improved waste assaying<sup>6</sup> and segregation and increased employee awareness and concern for reducing waste. Although not undertaken as a waste-saving measure, the use of remotely operated equipment to cut up large pieces of waste material has also reduced the amount of waste generated. In addition, by December 1989, Rocky Flats officials reduced waste generation to 70 cubic yards monthly by delaying the cleanout of gloveboxes<sup>7</sup> and the decontaminating and decommissioning of large equipment, except for those activities absolutely necessary for safety reasons.

In fiscal year 1988, Rocky Flats began using specialized assaying equipment on waste routinely classified as TRU waste prior to 1988. At that time, Rocky Flats also began to develop or purchase instruments capable of separating TRU waste from low-level waste from the gloveboxes.<sup>8</sup> For example, a new package counter was developed to sort waste packages

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<sup>6</sup>Assaying is the qualitative or quantitative analysis of a substance to determine its composition.

<sup>7</sup>A glovebox is a containment system used to process radioactive and/or hazardous materials/equipment. The system consists of secured gloves attached to a box, which allow workers, without risk of contamination, to handle materials inside the box.

<sup>8</sup>Waste containing less than 100 nanocuries per gram of radioactive material is classified as low-level waste. The state of Colorado, under a separate RCRA permit, regulates the amount of low-level mixed waste that can be stored on-site at Rocky Flats.

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at the 100-nanocuries per-gram level, thus allowing Rocky Flats to distinguish between low-level and TRU waste. Previously, all waste coming from certain buildings was routinely marked as TRU waste.

According to the EG&G Project Administrator of Waste Operations, in 1988, Rocky Flats took steps to increase the employee's awareness and concern about the need to reduce waste. Employees, directly and indirectly involved in handling and/or generating waste, were given training on using hazardous chemicals so that TRU-mixed waste could be minimized. In addition, Rocky Flats instituted a suggestion program, with awards, to further encourage waste reduction. Articles were placed in the plant newsletter to recognize those individuals contributing to the suggestion program and to emphasize the importance of reduced waste generation. The EG&G Director of Training said that Rocky Flats will use the results of a recent job task analysis to further improve the training to be provided to employees during 1990.

Rocky Flats has also made increasing use of the plant's Advanced Size Reduction Facility and correspondingly less use of the Size Reduction Vault. The Size Reduction Vault is less efficient in reducing the volume of waste than the Advanced Size Reduction Facility. In using the Size Reduction Vault, workers, wearing protective clothing and carrying self-contained breathing equipment, must manually cut up and repackage the waste material. Exposure to the radioactive material contaminates the protective clothing, generating an additional source of TRU waste that must be stored. In contrast, the Advanced Size Reduction Facility utilizes large gloveboxes and remotely operated equipment to perform the work. Rocky Flats plans to eliminate all use of the Size Reduction Vault.

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### Rocky Flats Plans to Remove Some Waste From the Current Inventory

Rocky Flats is reassaying some stored waste to determine whether it should be reclassified as low-level mixed waste rather than TRU-mixed waste. This reclassification is being done because prior to a few months ago, Rocky Flats considered all wastes coming from a glovebox as being TRU-mixed waste. However, according to a Rocky Flats official, an analysis of newly generated wastes indicated that some glovebox-generated waste was low-level waste rather than TRU-mixed waste and therefore not subject to the 1,601-cubic-yard limit. As a result, in January 1990, Rocky Flats began assaying 737 drums of TRU-mixed waste in storage that were previously assayed using less sensitive assaying equipment. The 737 drums represent those drums identified as containing between 0 and 2 grams of nuclear material. Rocky Flats officials estimate that

about 346 drums, or 100 cubic yards of TRU-mixed waste, could be reclassified as low-level mixed waste and therefore not count against the 1,601-cubic-yard, TRU-mixed waste storage limit. As of February 4, 1990, Rocky Flats had reassayed 43 drums and found that 20 drums actually contained low-level mixed waste. We estimate that if the estimated savings are realized, Limited Condition of Operation could be delayed about 6 weeks.

In addition, Rocky Flats officials are in the process of reviewing production records to determine whether some waste currently in storage should be recharacterized as unmixed TRU waste rather than TRU-mixed waste. Rocky Flats officials said that, in the past, it did not matter whether the waste was unmixed TRU waste or TRU-mixed waste because in both cases, the waste was shipped to the Idaho National Engineering Laboratory for storage. A Rocky Flats official estimates that 162 drums, or about 50 cubic yards of the current inventory characterized as TRU-mixed waste, may be properly recharacterized as unmixed TRU waste and therefore not count against the 1,601 cubic-yard limit. We estimate that if the 50-cubic-yard savings can be realized, Limited Condition of Operation could be delayed another 3 weeks.

### Rocky Flats Plans to Install a Supercompactor to Reduce Waste Volume

Rocky Flats officials plan to install a supercompactor, which may allow them to extend weapons component production into fiscal year 1992. A Rocky Flats official estimates that the supercompactor will reduce the volume of some TRU wastes produced at the facility by up to a factor of 5 and will result in an overall 50-percent reduction of TRU-mixed waste generated and stored at the site.

As of February 6, 1990, it was still uncertain when installation of the supercompactor would be completed and when it would become operational. First, installation was halted in August 1989 when DOE headquarters determined that an environmental assessment, as provided for under the National Environmental Policy Act (NEPA)(42 U.S.C. 4332), was needed. Rocky Flats submitted its latest revised environmental assessment to DOE for approval on February 7, 1990. If DOE, after reviewing the environmental assessment, determines that the supercompactor would not result in a significant environmental impact, installation of the supercompactor and related equipment could proceed.

According to a Rocky Flats official, if DOE approves the environmental assessment and issues a finding of no significant impact by mid-March 1990, operation of the supercompactor could begin about the first of

September 1990. Another Rocky Flats official, responsible for the NEPA process, was less optimistic as to when the environmental assessment would be approved. The official estimates that, based on the amount of time required to approve another high-priority environmental assessment, the environmental assessment for the supercompactor may not be approved until mid-April 1990. Further, this estimate does not take into account the possibility of DOE's providing a 30-day public comment period before approving the assessment. As of February 6, 1990, DOE had not decided on whether public comments would be obtained.

Second, further delays may also be encountered if problems are found during testing of the supercompactor equipment. According to the Rocky Flats Senior Waste Process Engineer responsible for obtaining and operating the supercompactor, on January 5, 1990, DOE authorized Rocky Flats to proceed with a warranty test of the supercompactor press. (The manufacturer's warranty expires 1 year from date of delivery, or July 1990.) According to this official, warranty checkout began on January 25, 1990, and should be completed by April 1, 1990. He said that, although replacement of equipment found to be defective could take months, he believed the supercompactor would work. However, he did express some concerns. For instance, the supercompactor components were purchased from various international vendors and have never been tested together. Problems could also occur because this will be the first time that a glovebox will be connected to a supercompactor. In addition, the supercompactor press, which was purchased from a West German vendor, was dropped during shipment breaking the shipping container and exposing the press to the sea air. When picked up at the dock, the press was found to be rusted, and some of the electrical wiring had been vandalized. The carrier was notified of the condition of the press, but additional action, if any, must await checkout of the supercompactor, according to a Rocky Flats' procurement official.

We conducted our review from November 1989 through January 1990 in accordance with generally accepted government auditing standards. We interviewed officials at DOE headquarters in Washington, D.C., and its Rocky Flats Area Office; Rockwell International Aerospace Operations, Rocky Flats Plant; EG&G Rocky Flats, Inc.; EPA Region VIII; and the Colorado Department of Health. We also reviewed official waste generation and storage records and Rocky Flats' plans to extend the storage deadline.

We discussed the contents of the report with DOE and contractor officials, who generally concurred with the facts presented. Their comments have been included in the report where appropriate. However, as you requested, we did not obtain official DOE comments on a draft of this report.

As agreed with your offices, unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days from the date of this letter. At that time, we will send copies to the Secretary of Energy, and the Director, Office of Management and Budget; and make copies available to others upon request.

Please call me at (202) 275-1441 if you have any additional questions or if we can be of further assistance. Major contributors to this report are listed in appendix I.



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